

ABSTRACT

Various embodiments of a magnetic memory element, including a storage layer and a reference layer, are disclosed. The storage layer includes two conjugate magnetic domain segments having opposing helicities. The reference layer is permanently magnetized. A non-magnetic layer is interposed between the two magnetic layers. The boundaries of the two conjugate magnetic domain segments of the storage layer define domain walls along the radial direction thereof. The magnetic moment direction of one domain wall points inward and the magnetic moment direction of the other domain wall points outward. The two domain walls always attract each other, leaving one segment significantly larger than the other. These two different conditions (each longer the other) define two binary data states. By sending a vertical current through the magnetic memory element, transitions between the memory states can be achieved. Also disclosed are a memory cell, a memory device, and a computing device.